TechLink Research Summary #3337

Biomimicry and the Foundation of Filtrexx Sustainable Management Practices (SMPs)

What would nature do? This is the driving force in how we approach problem solving, product innovation, and site design solutions. You can find this guiding principle in each of our major product lines from SiltSoxx™ and EnviroSoxx® – relying on natural materials and principles of water biofiltration, to our Living Shoreline and Bank Stabilization technologies – relying on natural materials and native plants to restore natural water cycles and protect biological diversity – all while restoring natural carbon cycles as a fundamental design feature. It is no coincidence that organic matter is the foundational material for all Filtrexx products, just as it is for all soil ecosystems worldwide. This essential material is the food, energy and habitat source for soil microorganisms.

These organisms provide:

- soil aggregation – making soils more stable and less erodible;
- nutrient cycling – mineralizing nutrients so they are available for plant growth and long term health; and
- food source for soil organisms at higher trophic levels.

Below ground, organic matter provides soil structure for air, water, and habitat for these organisms, and the efficient hydrologic and hydraulic function of the soil to allow for rainfall infiltration, pollutant filtration, and plant root stability. Above ground, organic matter protects the soil surface from erosion, regulates the water cycle through absorption and evaporation, slows runoff velocity, and filters runoff pollutants through chemical sorption and precipitation mechanisms.

Preservation of organic matter (a form of natural capital) at the landscape and watershed scale is where each of us can have the greatest impact. However, preservation is not always feasible due to economic, land area, and land development constraints. Designing or reestablishing organic matter, back into the landscape, can be just as important. Selecting native plant materials *and* native sources of organic matter will help to ensure maximum performance and health of above and below ground ecosystems; and when designed appropriately will help restore and sustain ecosystem services. This type of design also builds stability and resilience within the system to protect against future, unforeseen disturbances and disasters, both human and environmental.

Restoring and maintaining organic matter in soil ecosystems is the foundation of a stabile, resilient, and highly functioning soil hydrologic and soil food web system. Native soil ecosystems generally contain 0.5 to 5% soil organic matter, while systems at the high end of this range are generally more efficient and resilient.

The basis for this type of innovation and design is rooted in *Biomimicry*. Biomimicry is the imitation of the models, systems, and elements of nature for the purpose of solving complex human problems – it is *innovation inspired by nature*. According to Janine Benyus, Founder of the Biomimicry Institute, "When we look at what is truly sustainable, the only real model that has worked over long periods of time is the natural world". The Biomimicry Institute adds, "Biomimicry is an approach to innovation that seeks sustainable solutions to human challenges by emulating nature's time-tested patterns and strategies. The goal is to create products, processes, and policies—new ways of living—that are well-adapted to life on earth over the long haul. The core idea is that nature has already solved many of the problems we are grappling with. Animals, plants, and microbes are the consummate engineers. After billions of years of research and development, failures are fossils, and what surrounds us is the secret to survival."

Adoption of this approach to problem solving at Filtrexx has moved beyond simply product development, innovation, and design, and has now become ingrained in our culture. We have developed principles of Biomimicry to move beyond the idea of solely creating best management practices (BMPs) for our industry to challenging and leading our industry with truly *sustainable management practices* (SMPs).

By adopting and utilizing sustainable management practices we move beyond simply reducing environmental footprint, and into restoring ecosystems, rebuilding natural capital, and enhancing ecosystem services, locally and globally.

A *sustainable management practice is*:
- made from natural, biologically-based/organic materials;
- recycled and easily recycled for future use;
- locally manufactured from locally available materials;
- carbon neutral;
- made with minimal embodied energy; and
- has a low life cycle cost.

By definition, SMPs reduce our demand on petroleum and the pollution generated throughout its lifecycle, from extraction, refining, distribution, and end-use. Sustainable management practices help communities meet recycling goals[1], reduce carbon footprint[2], benefit local economies, and allow for the application of adapted and/or native materials to the landscapes or bioregions in which they are indigenous[3]. Sustainable management practices typically follow natural principles in their production and end use function, and ultimately, these practices restore natural cycles, including water, carbon, and nutrients, both on a landscape scale and community/bioregion level[4,5].

Creating truly sustainable management practices is our commitment to our customers, to our industry, and the sites and watersheds in which we deploy our products and services. "The biggest innovations of the 21st century will be at the intersection of biology and technology. *A new era is beginning*." – Steve Jobs

References Cited:

[1]Faucette, B. 2009. New sediment and stormwater technology may be greenest yet. The Georgia Engineer: The Business of Engineering. A4 Inc Publishing. 16:5:29.

[2]Faucette, Britt. 2008. Filtrexx International Carbon Footprint and Climate Change Mitigation Efforts. Erosion Control: The Official Journal of the International Erosion Control Association. August.

[3]Faucette, B. 2009. Innovative uses for compost BMPs sees growth. Land and Water Magazine. November/December: 25-27.

[4]Faucette, B. 2009. Using compost BMPs for LEED green building credits. Land and Water Magazine. May/June (35 Year Anniversary Edition): 41-45.

[5]Faucette, Britt. 2008. Compost Erosion Control Blankets: The Ultimate in Vegetation Establishment, Soil Quality Improvement and Sustainability. Stormwater: The Journal for Surface Water Quality Professionals. June.

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